

Amendments to the Claims

The following listing of the claims will replace all prior versions, and listings of the claims in the application:

Listing of Claims

1. (Currently Amended) A fuel cell system comprising:
a fuel cell;
a load value detecting means configured to detect a load value of a load of electric power or heat which is generated by equipment supplied with the electric power or the heat from said fuel cell system;
a load value storage means configured to store a history of the load value detected by said load value detecting means; and
a load value predicting means configured to predict a load value which is going to be generated based on the history of the load value and to store the predicted load value as load value data[[,]]; and
~~wherein scheduled start-up time of said fuel cell is decided~~ an operation control means configured to decide scheduled start-up time of said fuel cell based on the load value data predicted by said load value predicting means.
2. (Original) The fuel cell system according to claim 1, wherein the load value is a power value of a power load of the equipment supplied with the electric power from said fuel cell system, and the load value data is power value data.
3. (Currently Amended) The fuel cell system according to claim 2, further comprising:
a calculating means configured to calculate an amount of primary energy consumed to supply the electric power, ~~an amount of carbon dioxide generated by supplying the electric power, or a cost necessary to supply the electric power;~~
wherein said calculating means calculates the amount of primary energy, ~~the amount of carbon dioxide, or the cost,~~ based on the power value data for a predetermined time period, for a case where said fuel cell supplies the electric power and for a case where said a power system

separate from the fuel cell system supplies the electric power, and

said operation control means compares values calculated by said calculating means ~~are compared~~ and ~~start time of the time period is decided~~ decides start time of the time period as the scheduled start-up time when the value calculated for the case where said power system supplies the electric power is larger than the value calculated for the case where said fuel cell supplies the electric power.

4. (Currently Amended) The fuel cell system according to claim 3, wherein said calculating means calculates the amount of the primary energy consumed to supply the electric power from said fuel cell, ~~the amount of carbon dioxide generated by supplying the electric power from said fuel cell, or the cost necessary to supply the electric power from said fuel cell,~~ considering an amount of a primary energy consumed to start-up said fuel cell, ~~an amount of carbon dioxide generated at the start-up of said fuel cell, or a cost necessary to start-up said fuel cell.~~

5. (Currently Amended) The fuel cell system according to claim 4, wherein said calculating means calculates the amount of the primary energy consumed to start-up said fuel cell, ~~the amount of carbon dioxide generated at the start-up of said fuel cell, or the cost necessary to start-up said fuel cell,~~ based on a temperature of said fuel cell.

6. (Currently Amended) The fuel cell system according to claim 3, further comprising:
a fuel generator configured to generate a fuel containing hydrogen from a material,
wherein said calculating means calculates the amount of the primary energy consumed to supply the electric power from said fuel cell, ~~the amount of carbon dioxide generated by supplying the electric power from said fuel cell, or the cost necessary to supply the electric power from said fuel cell,~~ considering an amount of a primary energy consumed to start-up said fuel generator cell, ~~an amount of carbon dioxide generated at the start-up of said fuel cell, or a cost necessary to start-up said fuel cell.~~

7. (Currently Amended) The fuel cell system according to claim 6, wherein said calculating means calculates the amount of the primary energy consumed to start-up said fuel generator cell, ~~the amount of carbon dioxide generated at the start-up of said fuel cell, or the~~

~~cost necessary to start-up said fuel cell~~, based on a temperature of said fuel generator.

8. (Currently Amended) The fuel cell system according to claim 3, further comprising:
an input means by which the value to be calculated by said calculating means is selected
from the primary energy, ~~the carbon dioxide, or the cost~~.

9. (Currently Amended) The fuel cell system according to claim 3, further comprising:
a display means:
wherein a difference in the amount of primary energy, ~~the amount of carbon dioxide or
the cost~~ is calculated using the calculated values of said calculating means, for a case where said
fuel cell supplies the electric power and for a case where said power system supplies the electric
power, and said display means displays the difference.

10. (Currently Amended) The fuel cell system according to claim 3, further comprising:
a heat storage means configured to recover waste heat from said fuel cell and to store the
heat; and
a heat supply means configured to supply the heat stored in said heat storage means to
outside,

wherein said calculating means further calculates an amount of heat recovered by said
heat storage means, and an amount of the primary energy consumed to supply the heat from an
external heat supply means, ~~an amount of carbon dioxide generated by supplying the heat from
said external heat supply means, or a cost necessary to supply the heat from said external heat
supply means~~, based on the power value data for the time period, thereby calculating an amount
of primary energy, ~~an amount of carbon dioxide or a cost~~ for a case where said fuel cell supplies
the electric power and the heat and for a case where said power system supplies the electric
power and said external heat supply means supplies the heat, and

wherein said operation control means compares values calculated by said calculating
means ~~are compared and start time of the time period is decided~~ decides start time of the time
period as the scheduled start-up time when the value calculated for the case where said power
system and said external heat supply means supply the electric power and the heat, respectively,

is larger than the value calculated for the case where said fuel cell supplies the electric power and the heat.

11. (Original) The fuel cell system according to claim 1, wherein the scheduled start-up time is updated for each predetermined update time.

12. (Original) The fuel cell system according to claim 1, further comprising:
a display means configured to display the scheduled start-up time.

13. (Original) The fuel cell system according to claim 1, wherein said display means is configured to display a history of past operation.

14. (Original) The fuel cell system according to claim 1, further comprising:
a heat storage means configured to recover waste heat from said fuel cell and to store the heat;
a heat supply means configured to supply the heat stored in said heat storage means to outside; and
a stored heat amount detecting means configured to detect an amount of the heat stored in said heat storage means,
wherein the load value is a calorie value of a heat load of the equipment supplied with the heat from said fuel cell system, and the load value data is calorie value data.

15. (Currently Amended) The fuel cell system according to claim 14, further comprising:
a calculating means configured to calculate an amount of primary energy consumed to supply the heat and the electric power, ~~an amount of carbon dioxide generated by supplying the heat and the electric power, or a cost necessary to supply the heat and the electric power,~~
wherein said calculating means calculates the amount of primary energy, ~~the amount of carbon dioxide or the cost~~ based on the calorie value data for a predetermined time period for a case where said fuel cell supplies the electric power and the heat and for a case where said power system and said external heat supply means supply the electric power and the heat, respectively, and

wherein said operation control means compares values calculated by said calculating means ~~are compared~~ and ~~start time of the time period is decided~~decides start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the heat and the electric power.

16. (Currently Amended) The fuel cell system according to claim 15, wherein said calculating means calculates the amount of the primary energy consumed to supply the electric power and the heat from said fuel cell, ~~the amount of carbon dioxide generated by supplying the electric power and the heat from said fuel cell, or the cost necessary to supply the electric power and the heat from said fuel cell,~~ considering an amount of the primary energy consumed to start-up said fuel cell, ~~an amount of carbon dioxide generated at the start-up of said fuel cell, or a cost necessary to start-up said fuel cell.~~

17. (Currently Amended) The fuel cell system according to claim 16, wherein said calculating means calculates the amount of the primary energy consumed to start-up said fuel cell, ~~the amount of carbon dioxide generated at the start-up of said fuel cell, or the cost necessary to start-up said fuel cell,~~ based on a temperature of said fuel cell.

18. (Currently Amended) The fuel cell system according to claim 15, further comprising:
a fuel generator configured to generate a fuel containing hydrogen from a material,
wherein said calculating means calculates the amount of the primary energy consumed to supply the electric power and the heat from said fuel cell, ~~the amount of carbon dioxide generated by supplying the electric power and the heat from said fuel cell, or the cost necessary to supply the electric power and the heat from said fuel cell,~~ considering an amount of the primary energy consumed to start-up said fuel generator cell, ~~an amount of carbon dioxide generated at the start-up of said fuel cell, or a cost necessary to start-up said fuel cell.~~

19. (Currently Amended) The fuel cell system according to claim 18, wherein said calculating means calculates the amount of the primary energy consumed to start-up said

~~fuel generator cell, the amount of carbon dioxide generated at the start-up of said fuel cell, or the cost necessary to start-up said fuel cell, based on a temperature of said fuel generator.~~

20. (Currently Amended) The fuel cell system according to claim 15, further comprising:
an input means by which the value to be calculated by said calculating means is selected from the primary energy, ~~the carbon dioxide, or the cost.~~

21. (Currently Amended) The fuel cell system according to claim 15, further comprising:
a display means:
wherein a difference in the amount of primary energy, ~~the amount of carbon dioxide or the cost~~ is calculated using the calculated values of the calculating means, for the case where said fuel cell supplies the electric power and the heat and for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, and said display means displays the difference.

22. (Original) The fuel cell system according to claim 1, further comprising:
a heat storage means configured to recover waste heat from said fuel cell and to store the heat; a heat supply means configured to supply the heat stored in said heat storage means to outside;
a stored heat amount detecting means configured to detect an amount of the heat stored in said heat storage means; and
a selecting means configured to select the load value from a calorie value of a heat load of the equipment supplied with the heat from said fuel cell system or a power value of a power load of the equipment supplied with the electric power from said fuel cell system, and to thereby select power value data or calorie value data as the load value data.

23. (Original) The fuel cell system according to claim 22, wherein said load value storage means stores the load value such that the load value in a case where a user is at home and the load value in a case where the user is away from home are distinguished from each other, and
wherein said selecting means selects determination of the scheduled start-up time of said fuel cell from determination based on the power value data in the case where the user is at home,

determination based on the power value data in the case where the user is away from home,
determination based on the calorie value data in the case where the user is at home, and
determination based on the calorie value data in the case where the user is away from home.

24. (Original) The fuel cell system according to claim 1, further comprising:
an operation time setting means capable of, as desired, setting the scheduled start-up time
of said fuel cell.

25. (New) The fuel cell system according to claim 2, further comprising:
a calculating means configured to calculate an amount of carbon dioxide generated by
supplying the electric power;
wherein said calculating means calculates the amount of carbon dioxide, based on the
power value data for a predetermined time period, for a case where said fuel cell supplies the
electric power and for a case where said power system supplies the electric power, and
said operation control means compares values calculated by said calculating means and
decides start time of the time period as the scheduled start-up time when the value calculated for
the case where said power system supplies the electric power is larger than the value calculated
for the case where said fuel cell supplies the electric power.

26. (New) The fuel system according to claim 25, wherein said calculating means calculates
the amount of carbon dioxide generated by supplying the electric power from said fuel cell,
considering the amount of carbon dioxide generated at the start-up of said fuel cell.

27. (New) The fuel cell system according to claim 26, wherein said calculating means
calculates the amount of carbon dioxide generated at the start-up of said fuel cell, based on a
temperature of said fuel cell.

28. (New) The fuel cell system according to claim 25, wherein said calculating means
calculates the amount of carbon dioxide generated by supplying the electric power from said fuel
cell, considering an amount of carbon dioxide generated at the start-up of said fuel cell system.

29. (New) The fuel cell system according to claim 25, further comprising:
a fuel generator configured to generate a fuel containing hydrogen from a material,
wherein said calculating means calculates the amount of carbon dioxide generated by
supplying the electric power from said fuel cell, considering an amount of carbon dioxide
generated at the start-up of said fuel generator.
30. (New) The fuel cell system according to claim 29, wherein said calculating means
calculates the amount of carbon dioxide generated at the start-up of said fuel generator, based on
a temperature of said fuel generator.
31. (New) The fuel cell system according to claim 25, further comprising:
a heat storage means configured to recover waste heat from said fuel cell and to store the
heat; and
a heat supply means configured to supply the heat stored in said heat storage means to
outside,
wherein said calculating means further calculates an amount of heat recovered by said
heat storage means, and an amount of carbon dioxide generated by supplying the heat from said
external heat supply means, based on the power value data for the time period, thereby
calculating an amount of carbon dioxide for a case where said fuel cell supplies the electric
power and the heat and for a case where said power system supplies the electric power and said
external heat supply means supplies the heat, and
wherein said operation control means compares values calculated by said calculating
means and decides start time of the time period as the scheduled start-up time when the value
calculated for the case where said power system and said external heat supply means supply the
electric power and the heat, respectively, is larger than the value calculated for the case where
said fuel cell supplies the electric power and the heat.
32. (New) The fuel cell system according to claim 25, further comprising:
a display means:
wherein a difference in the amount of carbon dioxide is calculated using the calculated
values of said calculating means, for a case where said fuel cell supplies the electric power and

for a case where said power system supplies the electric power, and said display means displays the difference.

33. (New) The fuel cell system according to claim 25, further comprising:
an input means by which the value to be calculated by said calculating means is selected from carbon dioxide.
35. (New) The fuel system according to claim 34, wherein said calculating means calculates the cost necessary to supply the electric power from said fuel cell, considering a cost necessary to start-up said fuel cell.
36. (New) The fuel cell system according to claim 35, wherein said calculating means calculates the cost necessary to start up said fuel cell, based on a temperature of said fuel cell.
37. (New) The fuel cell system according to claim 34, wherein said calculating means calculates the cost necessary to supply the electric power from said fuel cell, considering a cost necessary to start-up said fuel cell system.
38. (New) The fuel cell system according to claim 34, further comprising:
a fuel generator configured to generate a fuel containing hydrogen from a material,
wherein said calculating means calculates the cost necessary to supply the electric power from said fuel cell, considering a cost necessary to start-up said fuel generator.
34. (New) The fuel cell system according to claim 2, further comprising:
a calculating means configured to calculate a cost necessary to supply the electric power;
wherein said calculating means calculates the cost, based on the power value data for a predetermined time period, for a case where said fuel cell supplies the electric power and for a case where said power system supplies the electric power, and
said operation control means compares values calculated by said calculating means and decides start time of the time period as the scheduled start-up time when the value calculated for

the case where said power system supplies the electric power is larger than the value calculated for the case where said fuel cell supplies the electric power.

39. (New) The fuel cell system according to claim 38, wherein said calculating means calculates the cost necessary to start-up said fuel generator, based on a temperature of said fuel generator.

40. (New) The fuel cell system according to claim 34, further comprising:
an input means by which the value to be calculated by said calculating means is selected from the cost.

41. (New) The fuel cell system according to claim 34, further comprising:
a display means:
wherein a difference in the cost is calculated using the calculated values of said calculating means, for a case where said fuel cell supplies the electric power and for a case where said power system supplies the electric power, and said display means displays the difference.

42. (New) The fuel cell system according to claim 34, further comprising:
a heat storage means configured to recover waste heat from said fuel cell and to store the heat; and
a heat supply means configured to supply the heat stored in said heat storage means to outside,
wherein said calculating means further calculates an amount of heat recovered by said heat storage means, and a cost necessary to supply the heat from said external heat supply means, based on the power value data for the time period, thereby calculating a cost for a case where said fuel cell supplies the electric power and the heat and for a case where said power system supplies the electric power and said external heat supply means supplies the heat, and
wherein said operation control means compares values calculated by said calculating means and decides start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the

electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the electric power and the heat.

43. (New) The fuel cell system according to claim 15, wherein said calculating means calculates the amount of primary energy consumed to supply the electric power and the heat from said fuel cell, considering an amount of the primary energy consumed to start-up said fuel system.

44. (New) The fuel cell system according to claim 14, further comprising:
a calculating means configured to calculate an amount of,
wherein said calculating means calculates the amount of carbon dioxide based on the calorie value data for a predetermined time period for a case where said fuel cell supplies the electric power and the heat and for a case where said power system and said external heat supply means supply the electric power and the heat, respectively, and

wherein said operation control means compares values calculated by said calculating means and decides start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the heat and the electric power.

45. (New) The fuel cell system according to claim 44, further comprising:
an input means by which the value to be calculated by said calculating means is selected from the carbon dioxide.

46. (New) The fuel cell system according to claim 44, further comprising:
a display means:
wherein a difference in the amount of carbon dioxide is calculated using the calculated values of the calculating means, for the case where said fuel cell supplies the electric power and the heat and for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, and said display means displays the difference.

47. (New) The fuel cell system according to claim 44, wherein said calculating means calculates the amount of carbon dioxide generated by supplying the electric power from said fuel cell, considering an amount of carbon dioxide generated at the start-up of said fuel cell system.

48. (New) The fuel cell system according to claim 44, wherein said calculating means calculates the amount of carbon dioxide generated by supplying the electric power and the heat from said fuel cell considering an amount of carbon dioxide generated at the start-up of said fuel cell, or a cost necessary to start-up said fuel cell.

49. (New) The fuel cell system according to claim 48, wherein said calculating means calculates the amount of carbon dioxide generated at the start-up of said fuel cell, based on a temperature of said fuel cell.

50. (New) The fuel cell system according to claim 44, further comprising:
a fuel generator configured to generate a fuel containing hydrogen from a material,
wherein said calculating means calculates the amount of carbon dioxide generated by supplying the electric power from said fuel cell, considering an amount of carbon dioxide generated at the start-up of said fuel generator.

51. (New) The fuel cell system according to claim 50, wherein said calculating means calculates the amount of carbon dioxide generated at the start-up of said fuel generator, based on a temperature of said fuel generator.

53. (New) The fuel cell system according to claim 52, wherein said calculating means calculates the cost necessary to supply the electric power and the heat from said fuel cell, considering a cost necessary to start-up said fuel cell.

54. (New) The fuel cell system according to claim 53, wherein said calculating means calculates the cost necessary to start up said fuel cell, based on a temperature of said fuel cell.

55. (New) The fuel cell system according to claim 52, wherein said calculating means calculates the cost necessary to supply the electric power from said fuel cell, considering a cost necessary to start-up said fuel cell system.52. (New) The fuel cell system according to claim 14, further comprising:

a calculating means configured to calculate a cost necessary to supply the heat and the electric power,

wherein said calculating means calculates the cost based on the calorie value data for a predetermined time period for a case where said fuel cell supplies the electric power and the heat and for a case where said power system and said external heat supply means supply the electric power and the heat, respectively, and

wherein said operation control means compares values calculated by said calculating means and decides start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the heat and the electric power.

56. (New) The fuel cell system according to claim 52, further comprising:

a fuel generator configured to generate a fuel containing hydrogen from a material,

wherein said calculating means calculates the cost necessary to supply the electric power from said fuel cell, considering a cost necessary to start-up said fuel generator.

57. (New) The fuel cell system according to claim 56, wherein said calculating means calculates the cost necessary to start-up said fuel generator, based on a temperature of said fuel generator.

58. (New) The fuel cell system according to claim 52, further comprising:

a display means:

wherein a difference in the cost is calculated using the calculated values of the calculating means, for the case where said fuel cell supplies the electric power and the heat and for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, and said display means displays the difference.

59. (New) The fuel cell system according to claim 52, further comprising:
an input means by which the value to be calculated by said calculating means is selected from the cost.
60. (New) A method of operating a fuel cell system comprising a fuel cell, comprising the steps of:
(a) detecting a load value of a load of electric power or heat which is generated by equipment supplied with the electric power or the heat from said fuel cell system;
(b) storing a history of the load value detected in step (a);
(c) predicting a load value which is going to be generated based on the history of the load value and storing the predicted load value as load value data; and
(d) deciding scheduled start-up time of said fuel cell based on the load value data predicted in step (c).
61. (New) The method according to claim 60, wherein the load value is a power value of a power load of the equipment supplied with the electric power from said fuel cell system, and the load value data is power value data.
62. (New) The method according to claim 61, further comprising the steps of:
(e) calculating an amount of primary energy consumed to supply the electric power, based on the power value data for a predetermined time period, for a case where said fuel cell supplies the electric power and for a case where said power system supplies the electric power; and
(f) comparing values calculated in step (e) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system supplies the electric power is larger than the value calculated for the case where said fuel cell supplies the electric power.
63. (New) The method according to claim 62, further comprising the steps of:

(g) calculating an amount of the waste heat which is recovered from said fuel cell and stored in a heat storage means, and an amount of the primary energy consumed to supply the amount of the recovered waste heat from an external heat supply means, based on the power value data for the time period, thereby calculating an amount of primary energy for a case where said fuel cell supplies the electric power and a heat supply means supplies the heat from the heat storage means and for a case where said power system supplies the electric power and said external heat supply means supplies the heat; and

(h) comparing values calculated in step (g) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the electric power and the heat supply means supplies the heat.

64. (New) The method according to claim 61, further comprising the steps of:

(e) calculating an amount of carbon dioxide generated by supplying the electric power, based on the power value data for a predetermined time period, for a case where said fuel cell supplies the electric power and for a case where said power system supplies the electric power; and

(f) comparing values calculated in step (e) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system supplies the electric power is larger than the value calculated for the case where said fuel cell supplies the electric power.

65. (New) The method according to claim 64, further comprising the steps of:

(g) calculating an amount of the waste heat which is recovered from said fuel cell and stored in a heat storage means, and an amount of carbon dioxide generated by supplying the amount of the recovered waste heat from an external heat supply means, based on the power value data for the time period, thereby calculating an amount of carbon dioxide for a case where said fuel cell supplies the electric power and a heat supply means supplies the heat from the heat storage means and for a case where said power system supplies the electric power and said external heat supply means supplies the heat; and

(h) comparing values calculated in step (g) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the electric power and the heat supply means supplies the heat.

66. (New) The method according to claim 61, further comprising the steps of:

(e) calculating a cost necessary to supply the electric power, based on the power value data for a predetermined time period, for a case where said fuel cell supplies the electric power and for a case where said power system supplies the electric power; and

(f) comparing values calculated in step (e) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system supplies the electric power is larger than the value calculated for the case where said fuel cell supplies the electric power

67. (New) The method according to claim 66, further comprising the steps of:

(g) calculating an amount of the waste heat which is recovered from said fuel cell and stored in a heat storage means, and a cost necessary to supply the amount of the recovered waste heat from an external heat supply means, based on the power value data for the time period, thereby calculating a cost for a case where said fuel cell supplies the electric power and a heat supply means supplies the heat from the heat storage means and for a case where said power system supplies the electric power and said external heat supply means supplies the heat; and

(h) comparing values calculated in step (g) and deciding start time of the time period as the scheduled start-up time when the value calculated for the case where said power system and said external heat supply means supply the electric power and the heat, respectively, is larger than the value calculated for the case where said fuel cell supplies the electric power and the heat supply means supplies the heat.